POCKET GSM

DUAL-BAND MODEM

- Dual-Band EGSM900/DCS1800
- Data Transmission up to 9.6Kbps V.32 and V.110
- SMS support PDU and Text mode
- Voice and Fax support
- Flash Upgradable

User's Guide

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http://www.digicom.it

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PREFACE

All rights reserved; no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, otherwise, without the prior written permission of Digicom S.p.A.
The following installation rules should be respected in order to have the best working order of the equipment and for the user's safety.

ENVIRONMENTAL CONDITIONS

Enviromental temperature Relative humidity

from -20 to +55°C from 20 to 80% n.c.

Rapid changes of temperature or humidity should be avoided.
This equipment, including cables, should be installed in an area free from:

- Dust, humidity, heat from direct sun light.
- Objects which irradiate heat. These could cause damage to the container or other problems.
- Objects which produce a strong electtromagnetic field (loudspeakers, etc.)
- Liquids or chemical corrosive substances.

CLEANING THE TERMINAL

Use a clean and soft cloth. Wet the cloth with water or natural detergent if it is necessary to remove any stains. Never use chemical products such as petrol or solvents.

VIBRATIONS OR DROPPING

Caution against vibrations and dropping.

DECLARATION CE OF CONFORMITY

We, Digicom S.p.A. registered office at: via Volta 39 - 21010 Cardano al Campo (Varese - Italy) declare under our sole responsability that the product:
Name: **POCKET GSM** Type: Modem Dual-Band GSM 900/1800MHz
satisfies the basic requirement of the below indicated Directive:

- 1999/5/CE of March 9 1999, R&TTE
  as having been designed in conformity with the requirements of following Reference Standards:
  EN 60950 EN 301 489-1 EN 301 489-7 EN 301-419-1 EN 301-511

1. INTRODUCTION

1

Congratulation on choosing digicom PocketGSM.

Pocket GSM is a **GSM Dual-Band modem (EGSM900/DCS1800)**, perfect for DATA, SMS, FAX and VOICE applications.
It has been designed to operate on any digital GSM network both directly and in roaming. PocketGSM is compliant with GSM Class 4 (900Mhz) and Class 1 (1800 Mhz). The dual band functionality depends on the network. Please refer to GSM provider for the availability of the service.

1.1. TECHNICAL FEATURES

Power Supply

Power Supply:	from 5 to 32 Vdc

Temperature

Operating:	from -20°C to +55°C
Storage:	from -20°C to +70°C

Connectors

Power Supply & I/O:	Mini-Fit™ 12 pin (Molex 556912A1)
Data interface:	9 pin RS232 (V24/V28)
Antenna:	SMA female
Audio:	RJ6 female (telephone handset)
SIM:	Plug-In 3V

Size

Size:	87x75x25mm
Weight:	about 130gr

1.2. WARNINGS

Satefy

Read carefully these instructions and notes before powering PocketGSM. For each situation please follow the specific instructions.

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PocketGSM is a low power radio transmitter and receiver. When it is ON, it sends receives radio frequency (RF) signals.
PocketGSM produces magnetic fields. Do not place it next to magnetic support such as floppy disks, tapes, et. . Operating your modem close to other electrical equipment such as television, phone, radios and personal computer, may cause interference.

Interference

PocketGSM, like all wireless devices, is subject to interferences that may reduce its performances.

Road Safety

Do not use PocketGSM while driving. In case of use on cars, it is necessary to check that electronic equipment is shielded against RF signal. Do not place PocketGSM over the air bag or in the air bag deployment area.

Aircraft Safety

Switch off PocketGSM in aircraft by disconnecting the Power cable. Using GSM devices on aircraft is illegal.

Hospital Safety

Do not use PocketGSM near health equipment, especially pacemaker and hearing aids, to avoid potential interferences. PocketGSM is a not mobile phone, do not use it in direct contact with the human body. Switch it off in hospitals, and medical center. Hospitals or health care facilities may be using equipment that could be sensitive to external RF energy.

Explosive Materials

Do not use PocketGSM in refuelling points, near fuel or chemicals. Do not use the PocketGSM where blasting is in progress. Observe restrictions, and follow any regulation or instruction.

Instructions for use

Do not use PocketGSM in direct contact with the human body, do not touch the antenna if not necessary when the phone is in use. Use approved accessories and batteries only. Do not connect incompatible products.

2. INSTALLATION

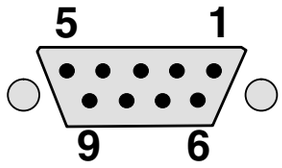
2

The GSM modem installation must be carried out between a range of temperature indicated in the manual.

Attention: the power supply voltage must not exceed the indicated maximum value as this may cause a damage of the product.

2.1. PIN-OUT CONNECTOR

Connect the serial port of your device to PocketGSM through a 9 pin RS232 right standard connector .
This table describes the position of the signals on Pocket GSM connector:



9 pin female connector (DCE)	Pin	Description	Initials
	1	Data Carrier Detect	DCD
	2	Receive Data	RD
	3	Transmitted Data	TD
	4	Data Terminal Ready	DTR
	5	Signal Ground	GND
	6	Data Set Ready	DSR
	7	Request To Send	RTS
	8	Clear To Send	CTS
	9	Ring Indicator	RI

In case your application supports TD and RD (transmission and reception)signals only, it is possible to connect it to the Pocket GSM. In this case it is important to configure PocketGSM to ignore the not present criteria.

[For further information about commands, see the chapters "Functional Examples" and "AT Commands"; you'll find the "AT Commands" chapter in the user's manual present on Digicom website]

The modem can receive AT commands at the speeds between 300 and 115200 bit/s.

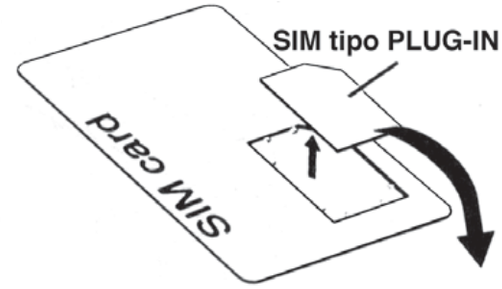
2.2. SIM CARD

Plug-in SIM are supported by PocketGSM.
To prevent damaging or losing information avoid touching the sim gold area.

Attention: Check with your GSM provider if your SIM is enable for data and fax traffic, if not ask him for this service, he will give you other two numbers (one for data calls and the other for fax calls).

Insert the SIM
Probably the SIM card will be supplied in a card holder compliant with the devices using the full-size SIM.

1. **Remove the SIM** carefully from the SIM holder.
2. Turn off Pocket GSM, by **disconnecting the power connector**.
3. Discover the SIM slot and **press on the release pin** with a finger or a pencil.
4. Insert the SIM card into the holder. Be sure the **angled corner** is top right.
5. Close the SIM holder and **press it up to the end**. Do not force the SIM holder and verify the correct position. .



2.3. CONNECTION TO THE EXTERNAL ANTENNA

To connect the external antenna go on as follows:

1. Turn off your Pocket GSM by disconnecting the power connector.
2. Connect the SMA male connector to the external antenna of Pocket GSM, screwing it clockwise.
3. Place the antenna and check there is a good quality signal.

You can check the signal:

- **Using a cellular phone**
  Insert the SIM of the PocketGSM in a cellular phone and check the quality of the signal.
- **Through the Led STATUS**
  Power on the modem and verify the STATUS Led. If it is red blinking, it means the modem is recognized by the GSM network. In this way you can check the signal but not its quality.

Attention: even if you see the STATUS Led blinking, it may not be sufficient for data transmission.

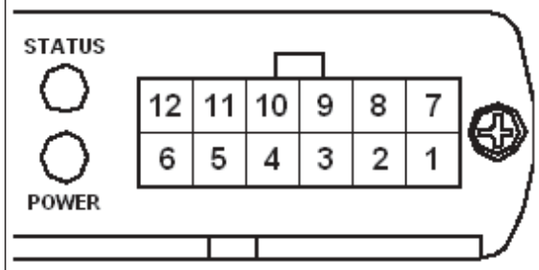
- **Through the AT+CSQ command**
  By using this command it is possible to detect a more precise signal. Power on PocketGSM and connect it to a Personal cpmputer, using a serial cable. With a hyperterminal send to the modem the command AT+CSQ.
  The modem will answer with +CSQ: x,y; where "x" is the signal quality, "y" is the BER (But Error Rate).
  The value of "x" can be included between 0 to 31; the higher value indicates a better signal.
  From 0 to 9 : poor
  From 10 to 15 : good
  From 16 to 31 : excellent
  99 = Unknown or uncalculable
  BER values higher than 2 may compromise the good operation of the device. In this case place the antenna in a better position.

[For further information about commands, see the chapters "Functional Examples" and "AT Commands"; you'll find the "AT Commands" chapter in the user's manual present on Digicom website]

Attention: for better performances of the supplied stilo antenna, we suggest to position it upwards. Try to fix Pocket GSM and its antenna at least one meter from the floor.
In case you use a different antenna, do not fix it directly to the mechanics of the product or on metal surfaces.

2.4. POWER SUPPLY

The inputs, outputs and power supply use a Minifit 12 pin connector:

Frontal view	PIN	Description	
	1	OUTPUT 2 (Open Collector)	(GPO2)
	2	OUTPUT 1 (Open Collector)	(GPO1)
	3	DIGITAL INPUT 4	(GPIO5)
	4	DIGITAL INPUT 3	(GPIO4)
	5	DIGITAL INPUT 2	(GPIO0)
	6	DIGITAL INPUT 1	(GPI3)
	7	N.C.	
	8	N.C.	
	9	Power supply from 5 to 32Vdc	
	10	GND	
	11	ANALOG INPUT 2	(ADC2)
	12	ANALOG INPUT 1	(ADC1)

pin 9 : positive [from +5 to +32Vdc]
pin 10 : negative [GND]

The modem has a special protection in case you accidentally invert the polarity.

The modem power supply must be included between 5 and 32 Vdc with ground negative.

Attention: the power supply voltage must not exceed the indicated maximum value as this may cause a damage of the product.

2.5. LED INDICATORS

Through two led indicators you can control the status of Pocket GSM:

LED	STATUS	DESCRIPTION
POWER	OFF	No power supply
	ON	Power supply on
STATUS	OFF	No power supply
	ON	PocketGSM is in one of the following status: - network search mode; - SIM card not present; - PIN not inserted; - emergency mode.
	SLOW BLINKING	PocketGSM detected by the GSM network
	FAST BLINKING	PocketGSM connected to another device

PocketGSM is ready to work only after it has been registered by the GSM network and with a good quality signal.
To verify that PocketGSM is ready for calls and SMS, follow these commands:

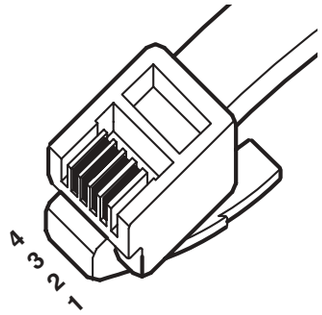
COMMAND	DESCRIPTION
AT+CPIN?	Verifies the presence of the SIM and the PIN code
AT+CREG?	Verifies the registration to the GSM network
AT+COPS?	Verifies the current GSM operator
AT+CSQ	Verifies the quality of GSM signal

[For further information about commands, see the chapters "Functional Examples" and "AT Commands"; you'll find the "AT Commands" chapter in the user's manual present on Digicom website]

2.6. CONNECTOR FOR THE VOICE MANAGEMENT

For the voice functionality, Pocket GSM is equipped with a double ended audio interface on RJ6 female connector with the same Pin-out of a standard telephone handset
The interface can be connected both to a handset or to a loud speaking telephone.

VOICE connector Pin-Out (RJ6)



1	Microphone (+)
2	Speaker (+)
3	Speaker (-)
4	Microphone (-)

The modem includes AC coupling and biasing for electret microphone.

Suggested characteristics for the microphone

Polarizzazione :	2V – 0.5mA
Impedance:	2KΩ
Sensitivity :	from –40dBm to –50dBm
SNR (Signal to Noise Ratio) :	> 50dBm

Suggested characteristics for the speaker

Type :	10mW, electro-magnetic
Impedance :	from 32 to 150 Ω

Suggest configuration

AT+SPEAKER=0
AT+ECHO=0
AT+SIDET=1,3

[For further information see the chapter "AT Commands" present in the user's manual on Digicom website]

3. FUNCTIONAL EXAMPLES

3

Pocket GSM can be programmed through a set of AT commands for the execution of all its functionalities.
If you are using a PocketGSM/GPRS, information for the GPRS functionality are present in “AT Commands” chapter. It is present in the user’s manual on Digicom web site.
Here the description of some applications. For the complete AT command set, see the chapter “AT Commands”.

Attention: In the factory configuration the AT commands are managed at 9600bit/s only (the PocketGSM/GPRS at 115200bit/s only). Before going on with your settings, you must set your terminal emulator (e.g. HyperTerminal) or your application as follows: 9600,8,N,1 (with PocketGSM/GPRS: 115200,8,N,1) then you can modify the interface speed with the values included between 300 and 115200bit/s with the command AT+IPR.

[For further information see the chapter “AT Commands” present in the user’s manual on Digicom website]

A) PIN management
B) PocketGSM ready to work
C) Serial cable not completed
D) Data transfer
E) SMS Management (Text mode)

A) PIN MANAGEMENT

Due to security reasons, usually SIM cards require the insertion of PIN code. With Pocket GSM you can insert the PIN code through the AT+CPIN command.
If your application has other security systems, you can disable the PIN request using a mobile phone.

Examples:

Command:	AT+CPIN?	(Verify the SIM and the PIN status)
Answer:	ERROR	(SIM card reading failed)
Answer:	+CPIN: READY	(PIN code present: SIM ready)
Answer:	+CPIN: SIM PIN	(PIN code insertion is required)
Answer:	+CPIN: SIM PUK	(PUK code insertion is required)
Answer:	+CPIN: SIM PIN2	(PIN2 code insertion is required)

In case the PIN code is not present, it must be inserted before using the SIM card:

Command:	AT+CPIN=4321	(PIN insertion)
Answer:	OK	(PIN code right)
Answer:	ERROR	(PIN code wrong)

Attention: remember that if the PIN code is wrongly inserted for three times, the SIM card will block. To unblock it you must insert the PUK code.

[For further information see the chapter "AT Commands" present in the user's manual on Digicom website]

B) POCKET GSM READY TO WORK

PocketGSM can work only after it has been detected by the network and with a good GSM signal. To verify PocketGSM is ready to manage calls and SMS, follow these commands:

Command:	AT+CPIN?	
Answer:	+CPIN: READY	(SIM is ready)
Command:	AT+CREG?	
Answer:	+CREG: 0,1	(GSM modem is registered by the network)
	OK	
Command:	AT+COPS?	
Answer:	+COPS: 0,2,22288	(PocketGSM is registered at operator 22288)
	OK	
Command:	AT+CSQ	
Answer:	+CSQ: 15,0	(GSM signal: good)
	OK	

The CSQ value can be included between 0 and 31, where 0 = –113dBm and 31 = –51dBm.
Every unit corresponds to 2 dBm.

From 0 to 9 = not sufficient
From 10 to 15 = good
From 16 to 31 = excellent

[For further information see the chapter "AT Commands" present in the user's manual on Digicom website]

C) SERIAL CABLE NOT COMPLETED

In case your application (eg. PLC) supports only TD and RD signals (Trasmission and Reception), it is however possible to connect it to the PocketGSM. In this case you will use a non-completed serial cable; for this reason it is important to configure PocketGSM so that it ignores the serial criteria not present. Usually PocketGSM, during the communication phase, checks the following criteria: 108 (Data Terminal Ready) and 105 (Request To Send): to disable them use the commands AT&D and AT+IFC.

Examples:

Command:	AT&D0	(Criterion 108 ignored)
Command:	AT&D2	(Criterion 108 managed as per specification)
Answer:	OK	

Command:	AT+IFC=0,0	(Criterion 105 ignored: flow control OFF)
Command:	AT+IFC=2,2	(Criterion 105 managed as per specification: flow control ON)
Answer:	OK	

D) DATA TRANSFER

PocketGSM can call and be called by analog (PSTN), digital (ISDN) and GSM devices. Usually DATA connections with analog modems are at 9600bit/s (V.32 protocol); ISDN connections use V.110 protocol with speed at 9600bit/s. The data transfer with another GSM device is carried out using V.32 or V.110 protocols.

DATA Calls

Using the ATD command it is possible to make a call. For example, to call the number 0123456789 you must send to the modem the command ATD0123456789<Enter>.
Depending on the AT+CBST command setting it is possible to program PocketGSM for analog, digital or GSM calls:

AT+CBST=0,0,1	connection with analog or GSM modems in multistandard (V.32)
AT+CBST=7,0,1	connection with analog or GSM modems only in V.32 at 9600bit/s
AT+CBST=71,0,1	connection with digital or GSM modem only in V.110 at 9600bit/s

Attention: check with your telephone operator if your SIM is enabled for DATA and eventually for FAX. In fact most SIMs are enabled for Voice(call and reception) while for DATA and FAX only the call is enabled.
To enable the reception of DATA and FAX traffic it is necessary to ask the telephone operator that will assign two additional numbers (one to receive DATA calls and one to receive FAX calls).

Examples:

Command:	AT+CBST=7,0,1	V.32 call at 9600bit/s
Answer:	OK	
Command:	ATD0123456789	
Answer:	CONNECT 9600	

Command:	AT+CBST=71,0,1	V.110 call at 9600bit/s
Answer:	OK	
Command:	ATD0123456789	
Answer:	CONNECT 9600	

DATA calls reception

Generally in PocketGSM the automatic answer is disabled (S0=0): in this case the modem will answer only after it received the ATA command.
In case you want to enable the automatic answer, you must set the S0 register with the number of rings after which to answer (eg. S0=2 automatic answer after two rings).
PocketGSM factory configuration has the AT+CBST=0,0,1 setting, in this way it will be able to answer to any call coming from an analog, ISDN or GSM modem.

[For further information see the chapter "AT Commands" present in the user's manual on Digicom website]

E) SMS MANAGEMENT (TEXT mode)

PocketGSM manages the SMS in TEXT and PDU format.

Send an SMS (TEXT mode)

You find here the necessary commands to send SMS in TEXT mode.

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1) Reading and Setup of the Services Center

To activate the SMS management, you must insert the identifier number of the Services Center for your GSM operator. In the most recent SIM cards, the identifier is already present in memory: to verify you can use a mobile phone or, with Pocket GSM, you can act as follows:

Command:	AT+CSCA?	(reading of Services Center)
Answer:	+CSCA: “+393205858500”,145	(Services Center present)
	OK	

If the Services Center number is not present, ask the telephone operator, then insert the identifier as follows:

Command:	AT+CSCA=”+393359609600”	(eg. TIM Services Center)
Answer:	OK	
Command:	AT+CSAS	(Save the number of Services Center)
Answer:	OK	

Attention: the above mentioned numbers (Services Centers) could be modified by the telephone operator. In case of error after you send the SMS, check the identifier of the Services Center with your Telephone Operator.

2) Define the mode

Command:	AT+CMGF=1	(TEXT mode)
Answer:	OK	
Command:	AT&W	(Save the configuration)
Answer:	OK	

3) Send a message:

Command:	AT+CMGS=”+393217654321”<enter>
Answer:	>

Text: First SMS message with Pocket GSM<ctrl z>
Answer: +CMGS: <sms index>
OK

After you digit yuor message, press <ctrl z> (Hex =1A).
In this example the message “First SMS message with Pocket GSM” is sent to number +393217654321.

Attention In case of error after you send the SMS, check the identifier of the Services Center with your Telephone Operator.

Read the SMS (TEXT mode)

The factory configuration of PocketGSM detects the coming of a new SMS. When an SMS arrives, PocketGSM send to the DTE (eg. PC) the following message: +CMTI: “SM”,2 (2 indicates the memory location of the SIM card where the SMS has been stored). To read the message use the AT+CMGR command:

Command: AT+CMGR=2
Answer: +CMGL: 2,"REC UNREAD","+393217654321",,"01/01/75,12:05:46+04"
Second SMS message with PocketGSM

To display all the messages present in the SIM memory:

Command: AT+CMGL=”ALL”
Answer: +CMGL: 1,"REC READ","+393217654321",,"01/01/75,12:05:46+04"
First SMS message with Pocket
+CMGL: 2,"REC UNREAD","+393217654321",,"01/01/75,12:06:26+04"
Second SMS message with PocketGSM
OK

Through the AT+CNMI command it is possible to program the PocketGSM so as it sends immediately the received message to the DTE (eg. PC):

Command: AT+CNMI=2,2
Answer: OK

With this configuration PocketGSM sends immediately the message to the DTE, when it receives it from the network:

+CMT: "+393217654321",,"01/01/75,12:06:14+00"
First SMS message with Pocket GSM

Cancel the SMS
For example, to cancel the second message:

Command: AT+CMGD=2
Answer: OK

[For further information see the chapter "AT Commands" present in the user's manual on Digicom website]

4. AT COMMANDS

4

PocketGSM supports a complete AT commands set to configure and test the modem and all its functionalities.
These commands are based on the following recommandations:

- **ETSI GSM 07.07**: Digital cellular telecommunications system (Phase 2); AT command set for GSM Mobile Equipment (ME);
- **ETSI GSM 07.05**: Digital cellular telecommunications system (Phase 2); Use of DTE-DCE interface for Short Message Service (SMS) and Cell Broadcast Service (CBS);
- **ITU-T Recommandation V.25ter**: Serial asynchronous automatic dialling and control.

The factory configuration of PocketGSM accepts AT commands only at 9600bit/s (the PocketGSM/GPRS only at 115200bit/s). Before going on you must set your terminal emulator (e.g. HyperTerminal) or your application with these values:

Bit per second	= 9600 (with PocketGSM/GPRS : 115200)
data bit	= 8
parity	= None
stop bit	= 1
flow control	= Hardware (RTS/CTS)

Use the commands **AT+IPR, AT+ICF, AT+IFC** to change the modem interface speed and the flow control.

4.1. COMMANDS NOTES

Please read these before using PocketGSM:

- The commands always start with AT; it means Attention, and end with **<CR> (Hex=0D)** character.
- The answer messages in extended format (**ATV1 command**) start and end with **<CR><LF> (Hex=0D 0A)**. If Pocket GSM is programmed to manage numeric answers

(ATV0), then the answer will not have the prefix **<CR><LF>** and will be ended with the <CR> character.

- To disable the answer messages use **ATQ1** command.
- If the syntax of the command is wrong, the modem sends the answer **ERROR**
- If the syntax of the command is correct but some incorrect parameters are used, the strings **+CME ERROR: <Err>** or **+CMS ERROR: <SMSErr>** are sent with different error codes.
- If the command has been successfully executed, the answer will be **OK**.

(In some cases, such as **AT+CPIN?** the modem will return the information requested without **OK**).

[In the "Functional Examples", and in the "AT commands description", the characters <CR> and <CR><LF> have been intentionally omitted.]

4.2. AT COMMANDS DESCRIPTION

4.2.1. GENERAL COMMANDS

ATA Answer an incoming call

When the modem receives a call, it sets the Ring Indicator signal and sends to the DTE (e.g. PC) the RING string (or +CRING: <type> if AT+CRC=1). If the automatic answer is disabled (ATS0=0), the ATA command enables the answer to an incoming call.

Command	Possible answers	Action
ATA	CONNECT	DATA call accepted
	OK	VOICE call accepted

ATD Dial command

This command will dial the number entered after the ATD string. When the modem detects the carrier from the GSM base station, it will answer with the message CONNECT: at this point the data transmission starts.
For further information on ATD command, see chapter "Functional Examples".

Command	Possible answers	Action
ATD<str>	CONNECT	DATA / FAX connection is established
	OK	VOICE connection is established
	BUSY	Remote device busy
	NO ANSWER	No answer from the called number
	NO CARRIER	Failed or refused call

<str>	Description	Examples
Numbers 0...9	National call	ATD0123456789
+	International call	ATD+987654321
;	At the end of the number for the VOICE calls	ATD0123456789;
L	Redial the last called telephone number	ATDL
>"text"	Call to the number in the phonebook associated with the "text" indentifier (by AT+CPBS command)	ATD>"Digicom"
>mem<idx>	Call to the number contained in mem position n	ATD>SM2
>n	Call to the number stored in the position n of the current phonebook; it can be selected with the AT+CPBS command	ATD>1

ATE Echo command

When the modem receives a command, it executes the echo of the received characters. With this command it is possible to enable and disable the echo.

Command	Possible answers	Action
ATE0	OK	Echo disabled
ATE1	OK	Echo enabled

Default: ATE1

ATH Hang up

When the modem is on-line after the escape sequence "+++", this command forces the modem to disconnect.

Command	Possible answers	Action
ATH	OK	The modem disconnects

ATO Back to On-Line mode

If you have to interrupt the data flow temporarily to verify the modem status or some registers without disconnecting, you can use the "+++" escape sequence. Then send the AT0 command to return to data mode.

Command	Possible answers	Action
ATO	CONNECT	Back to On-Line mode

ATQ Answer messages

This command is used to enable and disable the modem answers.

Command	Possible answers	Action
ATQ0	OK	Answer messages enabled
ATQ1	OK	Answer messages disabled

Default: ATQ0

ATS0 Auto answer

The S0 register allows to disable (ATS0=0) or to enable the modem autoanswer when arriving an incoming call.

Command	Possible answers	Action
ATS0=<n>	OK / ERROR	Auto answer after n rings
ATS0?	OK	Reading of S0 register

Default: ATS0=0

ATV Result code format

This command determines the modem response format: verbose code or numeric code.

Command	Possible answers	Action
ATV0	OK	Result code display as digit
ATV1	OK	Result code display as words

Default: ATV1

ATZ Load user profile

This command will load a user profile previously saved with the AT&W command.

Command	Possible answers	Action
ATZ	OK	Loads the user profile

AT%D Automatic dialing with DTR (C108)

This command allows to activate a DATA or VOICE autocall to the number stored in the first location of the SIM phonebook; or the automatic sending of an SMS stored in the SIM first location.
The number is dialed when DTR passes from OFF to ON status; the short message is sent when DTR passes from OFF to ON status.

Command	Possible answers	Action
AT%D0	OK	Function disabled
AT%D1	OK	Enables automatic dialing (DATA)
AT%D1;	OK	Enables automatic dialing (VOICE)
AT%D2	OK	Enables automatic sending of the SMS

Default: AT%D0

AT&C Data Carrier Detect (C109)

This command defines the management of the DCD (C109) on the modem serial port. If controlled (AT&C1), the DCD ON indicates the connection with a remote device. If forced (AT&C0) regardless of the status (connected/disconnected), the DCD is always ON.

Note: Data Carrier Detect can be controlled in DATA and FAX modes only.

Command	Possible answers	Action
AT&C0	OK	Data Carrier Detect always ON
AT&C1	OK	Data Carrier Detect is controlled and follows the connection status

Default: AT&C1

AT&D Data Terminal Ready (C108)

This command defines the management of the DTR (C108) on the modem serial port. The DTR comes from the DTE (e.g. PC) to the modem, for this reason the criterion can be present or absent. If absent, the modem must be configured to ignore the criterion (AT&D0). If present, the modem will accept the call only if the criterion is ON.
For further information on AT&D command, see chapter “Functional Examples”.

Command	Possible answers	Action
AT&D0	OK	DTR is ignored
AT&D1	OK	Modem switches from data to command mode when DTR switches from ON to OFF.
AT&D2	OK	When DTR switches from ON to OFF the modem disconnects.

Default: AT&D2

AT&F Restore factory settings

This command is used to load the factory settings for the command listed in the table.

Command	Possible answers	Action
AT&F	OK	Loads the factory configuration

Commands restored with AT&F

Q	S0	V	%D	+CBST	+CLIP	+CMEE
+CMGF	+CNMI	+COPS	+CR	+CRC	+CREG	+CSMP
+ECHO	+ILRR	+SIDET	+SPEAKER	+VGR	+VGT	

AT&S Data Set Ready (C107)

This command defines the management of DSR (C107) criterion present on the modem serial port. If controlled (AT&S1), the DSR ON indicates a connection with a remote device. When OFF it indicates the disconnection with the remote modem. If forced (AT&S0), regardless of the status (connected/disconnected), the DSR is always ON.

Note: Data Set Ready can be controlled in DATA and FAX modes only.

Command	Possible responses	Action
AT&S0	OK	Data Set Ready always ON
AT&S1	OK	Data Set Ready is controlled and follows the connection status

Default: AT&S1

AT&V Display configuration

Command	Possible answers	Action
AT&V0	OK	Displays the current configuration
AT&V1	OK	Displays the stored configuration
AT&V2	OK	Displays the factory configuration

AT&W Save current configuration

This command saves the active configuration, in the EEPROM.

Command	Possible answers	Action
AT&W	OK	Saves the configuration

This commands can be saved with AT&W

E	Q	S0	V	&C	&D	&S	+CBST
+CLIP	+CMEE	+CMGF	+COPS	+CR	+CRC	+CREG	+ICF
+IFC	+ILRR	+IPR	+SIDET	+SPEAKER		+VGR	+VGT

+++ Escape command

By sending the escape sequence, the modem switches from data to command mode. If the escape sequence is followed by the ATH command, the connection will be ended.

Note: the escape sequence works only with AT+ICF=3,4 (8N1) or =5,1 (7E1)

Command	Possible answers	Action
+++	OK	Return to command mode

AT+CGMM Model identification

Command	Possible answers	Action
AT+CGMM	MULTIBAND 900E 1800 OK	Device identification

AT+CGMR Modem firmware release

Command	Possible answers	Action
AT+CGMR	432a09gm.2D OK	Modem firmware release

AT+CGSN Product Serial Number (IMEI)

Command	Possible answers	Action
AT+CGSN	012345678901234 OK	International Mobile Equipment Identity (IMEI) of the GSM module

AT+CIMI IMSI (International Mobile Subscriber Identity)

This command is used to read and identify the IMSI of the SIM card.

Command	Possible answers	Action
AT+CIMI	222016200858803 OK	222 : Mobile Country Code (222 = Italy) 01 : Mobile Network Code (01 = Tim) 6200858803 : Mobile Subscriber Identification Number

AT+IPR Fixed DTE rate

This command specifies the data rate at which the modem will accept data from the DTE (e.g. PC); the answer messages from the modem will use the same speed.

Command	Possible answers	Action
AT+IPR=<speed>	OK / ERROR	Set the interface rate
AT+IPR?	+IPR: 9600	Shows the current speed
AT+IPR=?	+IPR: (0,2400,…)	Shows the available speeds

Default: AT+IPR=9600 (the PocketGSM/GPRS AT+IPR=115200)

<speed>	Description
0	Autobaud enabled: the modem automatically detects the speed, monitoring the received AT command.
From 300 to 115200 bit/s	Interface speed set at one of the following values: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s.

AT+ICF Data format

This command allows to select the data synchronous format, the modem will use to accept data from the DTE (e.g. PC); the modem answer messages will use the same format.

Note: a data format different from 8N1 (AT+ICF=3,4) disables the autobaud (AT+IPR=0) if active. If the data format is set at 8N1, the autobaud is automatically enabled.

Comando	Possibili risposte	Azione
AT+ICF=<format>,<parity>	OK / ERROR	Set data format
AT+ICF?	+ICF: 5,1	Shows the current settings
AT+ICF=?	+ICF: (1-6), (0-4)	Shows the available settings

Default: AT+ICF=3,4

<format>	Data Format		
1	Data: 8bit;	Parity: 0bit (None);	Stop: 2bit
2	Data: 8bit;	Parity: 1bit;	Stop: 1bit
3	Data: 8bit;	Parity: 0bit (None);	Stop: 1bit
4	Data: 7bit;	Parity: 0bit (None);	Stop: 2bit
5	Data: 7bit;	Parity: 1bit;	Stop: 1bit
6	Data: 7bit;	Parity: 0bit (None);	Stop: 1bit

<parity>	Parity Format
0	Odd
1	Even
2	Mark
3	Space
4	None

Examples

AT+ICF=3,4	Data: 8bit;	Parity: None;	Stop: 1bit
AT+ICF=5,0	Data: 7bit;	Parity: Odd;	Stop: 1bit
AT+ICF=5,1	Data: 7bit;	Parity: Even;	Stop: 1bit

AT+IFC Flow control

This command is used to set the flow control to be used.
For further information on the AT+IFC command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+IFC=0,0	OK	Flow control disabled
AT+IFC=2,2	OK	Enables the Hardware flow control (RTS/CTS)
AT+IFC?	+IFC: 2,2	Shows the current flow control
AT+IFC=?	+IFC: (0,2), (0,2)	Shows the available values

Default: AT+IFC=2,2

AT+ILRR Interface speed report

This command gives a report for the serial port speed, before the connection message.

Command	Possible answers	Action
AT+ILRR=0	OK	Report disabled
AT+ILRR=1	OK	Report enabled
AT+ILRR?	+ILRR: 0	Shows the current settings
AT+ILRR=?	+ILRR: (0,1)	Shows the available settings

Default: AT+ILRR=0

4.2.2. 07.07 GSM COMMANDS

AT+CBST Line Speed Setting

This command is used to select the line speed and the protocol for the DATA calls.
If Multistandard is selected:

- when transmitting, the modem sets with the maximum speed available on the GSM network (for Italy V.32 9600 bit/s)
- when receiving the modem recognizes the speed and the protocol suggested from the remote device.

For further information on AT+CBST command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CBST=<speed>,<mode>,<ce>	OK / ERROR	Sets the speed and the protocol
AT+CBST?	+CBST: 0,0,1	Shows the current settings
AT+CBST=?	+CBST: (0-7…), (0),…	Shows the available settings

Default: AT+CBST=0,0,1

<speed>	<mode>	<ce>	Description		
0	0	1	Multistandard		
1	0	1	V.21	300 bit/s	No Transparent
2	0	1	V.22	1200 bit/s	No Transparent
4	0	1	V.22 bis	2400 bit/s	No Transparent
6	0	1	V.32	4800 bit/s	No Transparent
7	0	1	V.32	9600 bit/s	No Transparent
66	0	1	V.110	1200 bit/s	No Transparent
68	0	1	V.110	2400 bit/s	No Transparent
70	0	1	V.110	4800 bit/s	No Transparent
71	0	1	V.110	9600 bit/s	No Transparent

AT+CEER Extended error report

This command gives a report with the cause of the last disconnection.
(See Appendix A for the error codes).

Command	Possible answers	Action
AT+CEER	+CEER: Error <err> OK	Cause of last disconnection

AT+CFUN Modem Restart

The AT+CFUN=1 command is used for a software reset of the modem; this means also a new registration to the GSM network. Before carrying out a reset, we suggest to save the current configuration (AT&W).
The AT+CFUN=0 or AT+CPOF commands are used to switch the modem in Stand-by mode: during this phase the modem is disconnected from the GSM network.
To exit from the Stand-by mode use the AT+CFUN=1 command.

Command	Possible answers	Action
AT+CFUN=0 (o AT+CPOF)	OK	Modem in Stand-by
AT+CFUN=1	OK	Modem restart

AT+CLIP Calling Line Identification (CLI)

When receiving a call, this command allows to identify the calling number. With the command AT+CLIP? It is possible to obtain the status of the “CLIP Service” in the network. The caller ID is displayed after any RING message.

Command	Possible answers	Action
AT+CLIP=0	OK	CLI displaying is disabled
AT+CLIP=1	OK	CLI displaying id enabled
AT+CLIP?	+CLIP: 0,<n>	Shows the current settings and the CLIP Service state
AT+CLIP=?	+CLIP: (0,1)	Shows the available settings

Default: AT+CLIP=0

<n> CLIP Service status in the network (reading only)

0 CLIP Service not available
1 CLIP Service available
2 Service Status: Unknown (no network…)

AT+CLIR Calling Line Identification restriction (CLI)

This command allows to hide the Calling Line Identification to the remote device.

Note: Independently from the setting of AT+CLIR, it is possible to add an "i" small letter at the end of the calling string to present the CLI to the remote user (e.g. ATD0123456789i); or the letter "I" capital letter to hide the CLI (e.g. ADT0123456789I).

Command	Possible answers	Action
AT+CLIR=0	OK	CLI presentation depends on the CLIR Sevice status.
AT+CLIR=1	OK	CLI is not displayed
AT+CLIR=2	OK	CLI is displayed
AT+CLIR?	+CLIR: 0,<n>	Shows the current settings and CLIR Service status
AT+CLIR=?	+CLIR: (0-2)	Shows the available settings

Default: AT+CLIR=0

<n> CLIR Service status in the network (reading only)

0 CLIR Service not available
1 CLIR Service available
2 Service Status: Unknown (no network…)
3 CLIR Service temporary suspended
4 CLIR Service temporary available

AT+CMEE Report Mobile Equipment errors

This command enables the report +CME ERROR: <err> and +CMS ERROR <SMSerr> with the indication of the error code, instead of a generic answer. (See Appendix A for error codes).

Command	Possible answers	Action
AT+CMEE=0	OK	Report disabled
AT+CMEE=1	OK	Report enabled
AT+CMEE?	+CMEE: 0	Shows the current settings

Default: AT+CMEE=0

AT+COPS Operator selection

PocketGSM can automatically detect the GSM operator both directly and in roaming. With this command you can check the current provider. Moreover, in extreme cases it is possible to force the registration to a specific provider: in this case check the registration status with the command AT+CREG.
With the command AT+COPS=? it is possible to verify the situation of the operators: 0 unknown operator; 1 operator is available; 2 current operator; 3 the operator is forbidden and cannot be selected.
For further information on AT+COPS command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+COPS=<mode>, <format>,<oper>	OK / ERROR	Selects the operator
AT+COPS?	+COPS: 0,2,22201	Shows the current operator
AT+COPS=?	+COPS: (2,"I TIM”,”TIM”,”22201”)…	Shows the available operators

Default: AT+COPS=0,2

<mode>	**Registration mode**
0	Automatic (<oper> is ignored)
1	Manual
4	If manual selection fails, automatic mode is entered
<format>	**Operator format**
0	Long alphanumeric format (e.g. I OMNITEL)
1	Short alphanumeric format (e.g. OMNI)
2	Numeric format (e.g. 22210)
<oper>	**Operator identifier**

AT+CPIN Enter PIN code

This command is used to enter the PIN and PUK codes. If the SIM card, used with Pocket GSM, has the PIN code enabled, it will be necessary to insert it each time you turn the modem on, to permit the registration to the GSM network.
The PIN and the PUK code management can be carried out with any mobile phone.
For further information on the PIN code management, see chapter “Functional Examples”.

Attention: If the PIN code is three times wrongly inserted, the SIM card is blocked. To unblock, insert the PUK code and the new PIN code. (e.g. AT+CPIN=12345678,1234).

Command	Possible answers	Action
AT+CPIN=<pin>	OK / ERROR	PIN code insertion
AT+CPIN=<puk>,<pin>	OK / ERROR	PUK and PIN insertion
AT+CPIN?	<status>	Shows the SIM status

<status>	Description
+CPIN: READY	PIN code is present: SIM ready
+CPIN: SIM PIN	PIN is required
+CPIN: SIM PUK	PUK is required
+CPIN: SIM PIN2	PIN2 is required
ERROR	SIM card reading failed

AT+CR Connection report

This command enables the report +CR: <type> that identifies the current connection. The report is given before the connection message.

Command	Possible answers	Action
AT+CR=0	OK	Report disabled
AT+CR=1	OK	Report enabled
AT+CR?	+CR: 0	Shows the current settings

Default: AT+CR=0

AT+CRC Cellular Result Code

This command enables the report +CRING: <type>, instead of the traditional RING message.

Command	Possible answers	Action
AT+CRC=0	OK	Report disabled
AT+CRC=1	OK	Report enabled
AT+CRC?	+CRC: 0	Shows current settings

Default: AT+CRC=0

AT+CREG GSM Network registration

This command enables the automatic report to any change of status during the modem registration to the GSM network.
For further information on AT+CREG command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CREG=<n>	OK	Report enabled or disabled
AT+CREG?	+CREG: <n>,<stat>,[<lac>,<ci>]	Shows the current registration status of the GSM modem to the network
AT+CREG=?	+CREG: (0-2)	Shows the available settings

Default: AT+CREG=0

<n>	**Report status**
0	Report disabled
1	Report enabled with +CREG: <stat>
2	Report enabled with +CREG: <stat>,<lac>,<ci>
<stat>	**Registration status**
0	Modem not registered, PocketGSM is not currently searching for a new operator
1	Modem registered with the same operator of the SIM card
2	Modem not registered, PocketGSM is searching for a new operator
3	Registration denied
4	Registered at an unknown network
5	Modem registered in roaming

<lac> Location Area Code in hexadecimal format (e.g. “00C3” is the same as “195” in decimal)

<ci> **Cell ID** in hexadecimal format

AT+CSQ GSM Signal Quality

This command is used to control the GSM quality signal.
For further information on AT+CSQ command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CSQ	+CSQ: <rssi>,<ber> OK	Reads the signal power and ber

<rssi>	**Reception level**
0	-113 dBm or less
1	-111 dBm
2…30	-109…-53 dBm
31	-51 dBm or greater
99	unknown or not detectable

Note: each unit corresponds to 2 dBm

<ber>	**bit error rate**
0	ber < 0,2%
1	0,2% < ber < 0,4%
2	0,4% < ber < 0,8%
3	0,8% < ber < 1,6%
4	1,6% < ber < 3,2%
5	3,2% < ber < 6,4%
6	6,4% < ber < 12,8%
7	ber > 12,8%
99	unknown or not detectable

4.2.3. PHONEBOOK COMMANDS

AT+CPBS Select Phonebook

This command selects the memory to be used for the phonebook.

Command	Possible answers	Action
AT+CPBS=<"storage">	OK / ERROR	Select the current phonebook memory
AT+CPBS?	+CPBS: <"storage">,<used>, <total>	and the available memory

Default: AT+CPBS="ME"

<"storage"> Phonebook

"ME" Modem phonebook (250 memory locations)
"SM" SIM phonebook (the number of locations depends on the SIM)
"LD" Last 10 dialled numbers
"RC" Last 10 received calls
<used> Locations used
<total> Total locations

AT+CPBW Write and cancel a telephone number

This command allows to write or to delete a telephone number in the current phonebook. It can be selected with the command AT+CPBS.

Command	Possible answers	Action
AT+CPBW=<index>,<"number">, <type>,<"text">	OK / ERROR	Insert the telephone number
AT+CPBW=<index>	OK	Cancel the telephone number
AT+CPBW=?	+CPBW: (lista <index>), <ilength>,(lista <type>), <tlength>	Shows the information on the memory of the selected phonebook

<index> Location where to save the telephone number
<"number"> telephone number
<type> 145 if <"number"> includes the "+" character in the international prefix
129 if <"number"> does not include the "+" character in the international prefix

Note: this parameter can be omitted.

<"text"> Mnemonic name of the telephone number
<ilength> Max length for <"number">
<tlength> Max length for <"text">

Examples

AT+CPBW=1,"+39320xxxxxxx",,"Ufficio Roma"	Location 1 inserted
AT+CPBW=2,"320xxxxxxx",129,"Ufficio Napoli"	Location 2 inserted
AT+CPBW=3,"320xxxxxxx",,"Casa"	Location 3 inserted
AT+CPBW=3	Location 3 cancelled

AT+CPBR Read a telephone number

This command is used to read a telephone number in the current phonebook and can be selected with the command AT+CPBS.

Command	Possible answers	Action
AT+CPBR=<idx1>,<idx2>	+CPBR: <idx1>,<number>,<type>,<text> … <idx2>,<number>,<type>,<text>	Reads the numbers in the phonebook from <idx1> to <idx2>

<idx1> e <idx2>	**Location range**
AT+CPBR=1	Read entry 1
AT+CPBR=1,10	Read entries from 1 to 10

AT+CPBF Search for a telephone number (knowing the stored text)

This command is used to find a telephone number inside the phonebook, knowing the associated identifier (e.g. starting with D…).

Command	Possible answers	Action
AT+CPBF=<"text">	+CPBF: <idx1>,<number>,<type>,<text> <idx2>,<number>,<type>,<text>	Displays the telephone numbers with the specified <"text"> identifier

AT+CPBP Search for a telephone number (knowing the number)

This command is used to find an identifier associated with a telephone number inside the phonebook, knowing the number itself.

Command	Possible answers	Action
AT+CPBP=<"number">	+CPBP: <idx1>,<number>,<type>,<text>	Displays the identifier associated with the specified <"number">

4.2.4. VOICE COMMANDS

PocketGSM can call another voice device with the ATD<number>; command:
e.g.ATD0123456789;

When the remote device answers the call, PocketGSM will show the OK message.

For the voice functionality, PocketGSM is equipped with a double-ended audio interface on RJ6 female connector with the same Pin-out of a standard telephone handset.
The interface can be connected both to a handset and to a loud speaking telephone.

In order to improve the quality of the voice it will be necessary to modify some parameters to delete the echo, the noise, etc. In this paragraph you can find the commands necessary to improve the voice quality. To save the configuration use the AT&W command.

AT+SPEAKER Speaker and Microphone selection

With a single command, you can set the factory parameters of the commands: *AT+VGR*, *AT+VGT*, *etc*; in this way you can quickly improve the quality of the voice.

Note: Act also on AT+VGR, AT+CGT, commands to improve the quality of the voice. If there is noise you could connect an external antenna with extension cable.

Command	Possible answers	Action
AT+SPEAKER=0	OK	Configuration for "telephone handset"
AT+SPEAKER?	+SPEAKER: 0	Shows the current settings

Default: AT+SPEAKER=0

AT+CMUT Mute Control

During a voice connection, this command disables the microphone while the speaker is always active.

Command	Possible answers	Action
AT+CMUT=0	OK	Microphone enabled
AT+CMUT=1	OK	Microphone disabled (MUTE)
AT+CMUT?	+CMUT: 0	Shows the current settings

Default: AT+CMUT=0

AT+VTS Send DTMF tones

During a voice connection, this command sends the DTMF tones, to allow the surfing in vocal servers.

Note: wait always the OK, before sending another tone.

Command	Possible answers	Action
AT+VTS=<DTMF>	OK / ERROR	Send the specified DTMF tone

<DTMF>	DTMF tones
0…9	Numbers from 0 to 9
#	# character
*	Asterisk character
A…D	A, B, C, D characters

AT+VTD Length of the DTMF tone

This command is used to increase or reduce the length of the DTMF tone, sent with the command AT+VTS.

Command	Possible answers	Action
AT+VTD=<time>	OK / ERROR	Sets the length of the DTMF tone
AT+VTD?	+VTD: 1	Shows the current settings

Default: AT+VTD=1

<time>	DTMF tones
1	100 milliseconds
2	200 milliseconds
…	…
10	1 second
…	…

AT+VGR Speaker gain control

This command is used to set the receiving level of the speaker.
(See Appendix A for the values of the speaker gain).

Command	Possible answers	Action
AT+VGR=<val>	OK / ERROR	Sets the receiving level of the speaker
AT+VGR?	+VGR: 64	Shows the current settings

AT+VGT Microphone gain control

This command is used to set the transmission level of the microphone.
(See Appendix A for the values of the microphone gain).

Command	Possible answers	Action
AT+VGT=<val>	OK / ERROR	Sets the transmission level of the microphone
AT+VGT?	+VGT: 64	Shows the current settings

AT+ECHO Echo cancellation

This command enables the echo cancellation for voice calls in small rooms. It could be necessary to act on the (AT+VGT) and (AT+VGR) commands for a best voice quality.

Command	Possible answers	Action
AT+ECHO=<mode>,<algold>	OK / ERROR	Sets the echo cancellation
AT+ECHO?	+ECHO: <status>,<algold>	Shows the current settings

<mode> Mode

0 Echo disabled

1 Echo enabled

Note: you can enable/disable the echo cancellation during a call without restarting the modem if you don't change the Algorithm.

<algold> Algorithm

1 Echo cancellation 1

3 Echo cancellation 3

<status> Status

0 Eco disabled

1 Eco enabled for "telephone handset"

2 Eco enabled for "loud speaking telephone"

3 Module reset

AT+SIDET SideTone Control

This command is used to set the echo level of the voice in the speaker (to have a microphone feedback in the speaker).

Command	Possible answers	Action
AT+SIDET=0,<val>	OK / ERROR	SideTone disabled
AT+SIDET=1,<val>	OK / ERROR	SideTone enabled
AT+SIDET?	+SIDET: 1,1	Shows the current settings

<val>	Description
0	0 db
1	-6db
2	-12db
3	-18db

AT+VIP Voice parameters Initialization

This command allows to restore the factory settings for the voice parameters from EEPROM. These voice parameters include: AT+SPEAKER; AT+CMUT; AT+VGR; AT+VGT AT+ECHO; AT+SIDET.

Command	Possible answers	Action
AT+VIP=1	OK	Restores the factory settings

4.2.5. SMS CONTROL COMMANDS (GSM 07.05)

AT+CMGF Messages format

This command is used to define the SMS format (Short Message Service).
For further information on AT+CMGF command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CMGF=0	OK	SMS in PDU mode
AT+CMGF=1	OK	SMS in Text mode
AT+CMGF?	+CMGF: 1	Shows the current settings

AT+CSCA Service Center Number

This command allows to set the Service Center number in the SIM card memory. An error will occur if trying to send an SMS using a wrong number of the Services Center. Verify with your GSM Operator the number of the Service Center.
For further information on AT+CSCA command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CSCA?	+CSCA: “Service Center Address”	Displays the Service Center number
AT+CSCA=“ Service Center Address”	OK	Inserts the Service Center number

AT+CSMP Period of Validity for the SMS

This command is used to define period of validity of the message in the Services Center.

Command	Possible answers	Action
AT+CSMP=<fo>,<vp>, <pid>,<dcs>	OK / ERROR	Sets the period of validity
AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs>	Shows the current settings

Default: AT+CSMP=1,167

<fo> **Reserved (value is 1, do not modify)**

<vp> **Period of validity**

“11“ 1 hour
“71“ 6 hours
“167“ 24 hours
“173” 1 week
“255” Higher

<pid> **Reserved**

<dcs> **Reserved**

AT+CSAS Save settings

This command allows to save the settings of the following commands: AT+CSCA, AT+CSMP and AT+CNMI.
For further information on AT+CSAS command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CSAS	OK	Save the current settings

AT+CRES Restore settings

This command restores the setting of the following commands: AT+CSCA, AT+CSMP and AT+CNMI.

Command	Possible answers	Action
AT+CRES	OK	Restore the saved settings

AT+CNMI Indication of New incoming message

This command displays a report when a new SMS arrives.
For further information on AT+CNMI command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CNMI=<mode>,<mt>	OK / ERROR	Select the report display mode
AT+CNMI?	+CNMI: <mode>,<mt>	Shows the current settings

Default: AT+CNMI=0,1

<mode>	**Display Mode**
2	If the modem is Off-line, the message will be displayed on the DTE in <mt> format. If the modem is On-line, the message will be displayed on the DTE in <mt> format at the end of the connection.
0,1,3	Equal to 2
<mt>	**Report format**
0	No report
1	Report with format: +CMTI: <mem>,<index>
2	Report with format: +CMT:<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<lengh>] <data>

Examples

1) AT+CNMI=2,1
   Report: +CMTI: "SM",2
   Description: The received SMS has been stored in the location 2 of the SIM memory.

2) AT+CNMI=2,2
   Report: +CMT: "+393217654321",,"01/01/75,12:06:14+00"
   First SMS message with PocketGSM
   Description: the received SMS is displayed directly on the DTE.

AT+CMGD Delete messages

This command is used to delete the SMS messages stored in the SIM memory.
For further information on AT+CMGD command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CMGD=<index>,<deflag>	OK / ERROR	Cancella i messaggi SMS

<index> **Memory index**

<deflag> **Delete method**

0 Delete the message in the <index> position.
If <deflag> value is omitted, it will be equal at 0.

1 Delete all the received and read messages: “REC READ”. The <index> value is ignored.

2 Delete all the received, read, saved and sent messages: “REC READ” and “STO SENT”. The <index> value is ignored.

3 Delete all the received, read, saved, sent and unsent messages: “REC READ”, “STO SENT” and “STO UNSENT”. The <index> value is ignored.

4 Delete all messages. The <index> value is ignored.

AT+CMGL Messages List

This command displays the list of the SMS messages stored in the SIM memory.
For further information on AT+CMGL command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CMGL=<stat>	OK / ERROR	Shows the list of SMS

<stat> Display method

Text mode	PDU mode	Description
“REC UNREAD”	0	Displays all the received unread messages
“REC READ”	1	Displays all the received and read messages
“STO UNSENT”	2	Displays all the stored unsent messages
“STO SENT”	3	Displays all the stored sent messages
“ALL”	4	Display all the messages

AT+CMGR Display message

This command allows to display a specific SMS stored in the SIM memory
For further information on AT+CMGR command, see the chapter “Functional Examples”.

Command	Possible answers	Action
AT+CMGR=<index>	OK	Shows the message

AT+CMGS Send SMS

This command is used to send a SMS message in Text mode.
For further information on AT+CMGS command, see the chapter “Functional Examples”.

Examples

Command: AT+CMGS=”+393217654321”<enter>
Answer: >
Text: First SMS message with PocketGSM<ctrl z>
Answer: +CMGS: <sms index>
OK

Compose your message, press <ctrl z> (Hex =1A). To cancel the procedure, press <esc> (Hex = 1B).
In this example the message “First SMS message with Pocket GSM” is sent to number +393217654321.

AT+CMSS Send a stored SMS

This command is used to send a previously stored SMS message in Text format. Check the memory location with the AT+CMGL=”ALL” command.

Command	Possible answers	Action
AT+CMSS=<index>	OK	Sends the SMS message stored in <index> location

AT+CMGW Store an SMS

This command is used to store an SMS message in text format into the SIM memory.

Examples

Command: AT+CMGW=”+393217654321”<enter>
Answer: >
Text: First SMS message with PocketGSM<ctrl z>
Answer: +CMGW: <sms index>
OK

Compose your message, press <ctrl z> (Hex =1A). To cancel the procedure, press <esc> (Hex = 1B).
In this example the message “First SMS message with Pocket GSM” is stored.

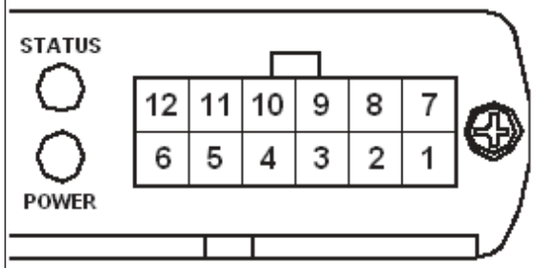
4.2.6. GPIO COMMANDS (GENERAL PURPOSE INPUT OUTPUT)

Besides the functionalities for the DATA, SMS, FAX and VOICE management, Pocket GSM can also read some inputs contacts and control some output relays.
Thanks to this characteristic, you will be able to build a complete application using a single device:

- you can detect the status change of an input and send an SMS alarm;
- you can receive a specific SMS and control a output relay.

In this paragraph you find the characteristics of the General Purpose Input/Output (GPIO) and the AT commands to control them.

MINIFIT CONNECTOR
The inputs, the outputs and the power supply are managed through a Minifit connector (12 pin):

Frontal view	PIN	Description		Wire color (1)
	1	OUTPUT 2 [Open Collector]	(GPO2)	Yellow
	2	OUTPUT 1 [Open Collector]	(GPO1)	Green
	3	INPUT DIGITALE 4	(GPIO5)	Blue
	4	INPUT DIGITALE 3	(GPIO4)	Light Blue
	5	INPUT DIGITALE 2	(GPIO0)	Brown
	6	INPUT DIGITALE 1	(GPI3)	Violet
	7	N.C.		White
	8	N.C.		Grey
	9	from +5 to +32Vdc		Red
	10	GND		Black
	11	INPUT ANALOGICO 2	(ADC2)	Pink
	12	INPUT ANALOGICO 1	(ADC1)	Orange

(1) If you use the complete connector with 12 cables.

Power on PocketGSM connecting the cable with the correct polarity:

pin 9: positive [from +5 to +32Vdc]
pin 10: negative [GND]

The modem has a special protection in case you accidentally invert the polarity.

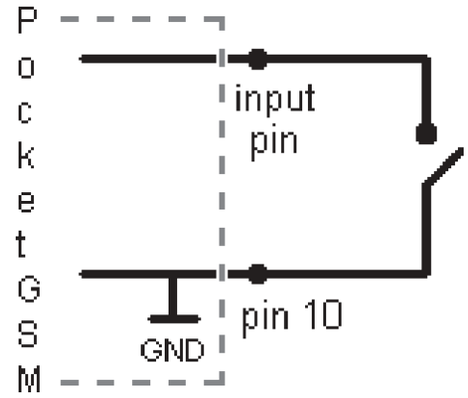
CHARACTERISTICS OF GPIO CONTACTS

PocketGSM supports:

- 4 digital inputs (two logical states: ON/OFF);
- 2 analog inputs;
- 2 output open-collector.

Digital Inputs

Two status are supported for each input: open or closed to ground.
It is necessary connect only a free contact (without voltage) between the input pin (pin 6, 5, 4, 3) and the ground pin (pin 10).



DIGITAL INPUT CHARACTERISTICS

Permitted status:
- Input open
- Input closed to ground (GND)

Analog Inputs

Two Analog to Digital Converter are available on the PocketGSM. These converters have a 10 bit resolution, ranging from 0 to 28 Vdc.

ANALOG INPUT CHARACTERISTICS

Resolution	• 10bit
Input signal range	• From 0 to 28Vdc

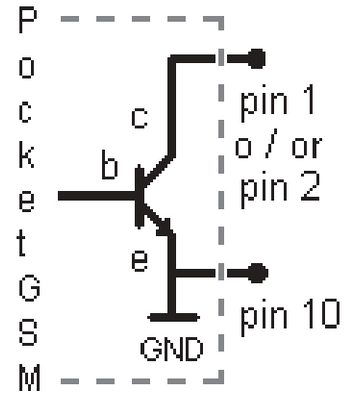
To read the value, use AT+ADC command. Send AT+ADC=1 command and read the value with AT+ADC? command.

Command	Possible answers	Action
AT+ADC?	+ADC: <ADC3>,<ADC2>,<ADC1>	Shows the current value

Ignore the first value <ADC3>; read only ADC1 and ADC2. This command gets the (DC level * 1024) of ADC1 and ADC2.

Output

The two outputs of PocketGSM (old and new version), manage the devices that can be activated and deactivated through a switch. (e.g. Lamp, Sound, Logic Port, etc...).

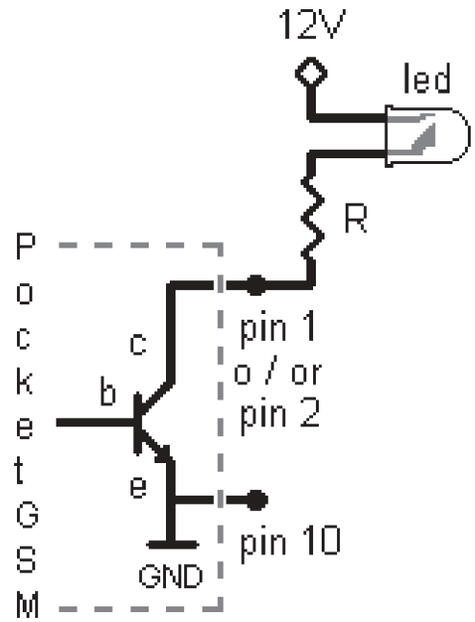


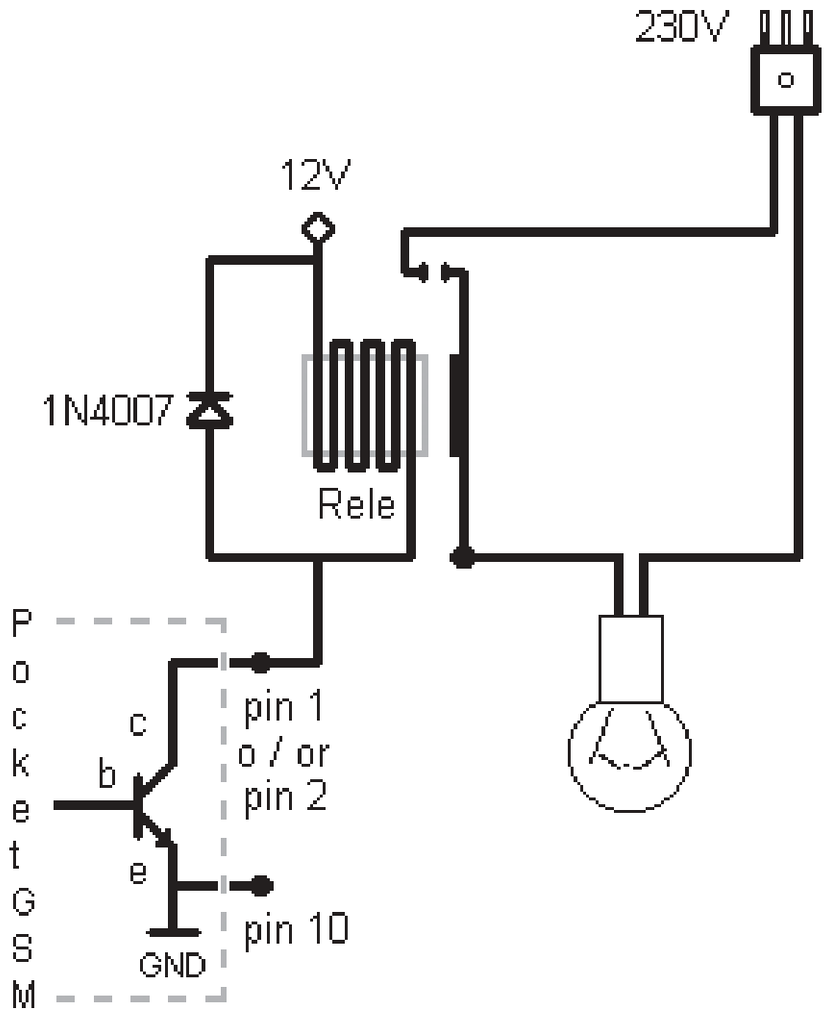
To connect your devices, check the Transistor characteristics: max collector-emitter voltage (Vce) and collector current (Ic):

Vce (max): 45V
Ic (max): 500mA

Connection Examples

If you want to manage a simple led (1,5V – 20mA), with a 12V power supply, you must add a pull-up resistor (470Ω) to limit the current.





If you want to manage a lamp with 230V power supply, you can connect an external rele and a diode (1N4007 or 1N4148) to protect the transistor inside the PocketGSM

Note: if you use a cable to connect the rele, connect the diode close to the pin1 or pin2 of the PocketGSM to protect the transistor inside the PocketGSM.

AT+WIOM Input/Output Configuration

This command allows to configure the 6 contacts I/O. If they are configures as Output, it is possible to establish the default status (Reset or Set) at every restart.

Command	Possible answers	Action
AT+WIOM=<IODir>,<IOVal>	OK / ERROR	GPIO configured
AT+WIOM?	+WIOM: <IODir>,<IOVal>	Shows the current settings

<IODir>	**GPIO direction (Input or Output) (bit mapped register)**	
bit 0	0 = GPIO0	configured as Input
	1 = GPIO0	configured as Output
bit 1	1 = GPO1	configured as Output
bit 2	1 = GPO2	onfigured as Output
bit 3	0 = GPI3	configured as Input
bit 4	0 = GPIO4	configured as Input
	1 = GPIO4	configured as Output
bit 5	0 = GPIO5	configured as Input
	1 = GPIO5	configured as Output
bit 6-7	Not used	
<IOVal>	**Output default value after reset (bit mapped register)**	
0	OUTPUT1	Reset
	OUTPUT2	Reset
2	OUTPUT1	Set
	OUTPUT2	Reset
4	OUTPUT1	Reset
	OUTPUT2	Set
6	OUTPUT1	Set
	OUTPUT2	Set

Remember:

The Open Collector outputs are usually OPEN.

Possible settings

AT+WIOM=6,0	GPIO0	INPUT2	
	GPO1	OUTPUT1	(initial state: Reset)
	GPO2	OUTPUT2	(initial state: Reset)
	GPI3	INPUT1	
	GPIO4	INPUT3	
	GPIO5	INPUT4	
AT+WIOM=6,2	GPIO0	INPUT2	
	GPO1	OUTPUT1	(initial state: Set)
	GPO2	OUTPUT2	(initial state: Reset)
	GPI3	INPUT1	
	GPIO4	INPUT3	
	GPIO5	INPUT4	
AT+WIOM=6,4	GPIO0	INPUT2	
	GPO1	OUTPUT1	(initial state: Reset)
	GPO2	OUTPUT2	(initial state: Set)
	GPI3	INPUT1	
	GPIO4	INPUT3	
	GPIO5	INPUT4	
AT+WIOM=6,6	GPIO0	INPUT2	
	GPO1	OUTPUT1	(initial state: Set)
	GPO2	OUTPUT2	(initial state: Set)
	GPI3	INPUT1	
	GPIO4	INPUT3	
	GPIO5	INPUT4	

AT+WIOR Read GPIO value

This command reads the current state (Reset or Set) of an Input. It is not possible to read the state of an Output. Trying to read an Output status will cause an ERROR.

Command	Possible answers	Action
AT+WIOR=<Index>	+WIOR: <Val>	Reads the current status

<Index> Digital Input index (values: 0, 3, 4, 5)

AT+WIOR=3 Reads the Digital Input 1 status
AT+WIOR=0 Reads the Digital Input 2 status
AT+WIOR=4 Reads the Digital Input 3 status
AT+WIOR=5 Reads the Digital Input 4 status

<Val> Digital Input state

0 Reset
1 Set

AT+WIOW Write GPIO value

This command writes the state (Reset o Set) of an Output. It is not possible to write the state of an Input. Trying to write an Input status will cause an ERROR.
By default (after a power off/on) the Output contact is set by AT+WIOM command.

Command	Possible answers	Action
AT+WIOW=<Index>,<Val>	OK / ERROR	Writes the output status

<Index> Output index (values 1, 2)

AT+WIOW=1,<Val> Writes the Output 1 status
AT+WIOW=2, <Val> Writes the Output 2 status

<Val> GPIO state

0 Reset
1 Set

4.2.7. GPRS COMMANDS (GSM 07.07)

The GPRS functionality is available only in some versions of PocketGSM. If available for the best use of the GPRS function, we suggest to set **AT+IPR=0** (autobaud) and to save the configuration with **AT&W** command. After the driver installation, select in driver properties the interface speed at **115200**.

GPRS activation
Verify with your GSM Operator the GPRS activation.

GPRS configuration
To configure PocketGSM for GPRS connection, you must send the AT+CGDCONT to se the access profile to the service.
Check with the GSM Operator your access profile.
AT+CGDCONT=1,”IP”,”APN”
You can insert the AT+CGDCONT command in the **Additional string** in the driver properties or send the command by HyperTerminal and save it with **AT&W** command.

Connection
Now you are ready for a Dial-Up connection and a GPRS connection, using the drivers.
Verify with your GSM Operator the GPRS parameters (e.g. User ID, password, phone number).

For further technical information and for the driver, see the Support area on our web site www.digicom.it, or send a e-mail to support@digicom.it

APPENDIX A

A

A1. (+CEER: Error <err>) Report Error Codes

<err>	Description
1	Unassigned (unallocated) number
3	No route to destination
6	Channel unacceptable
8	Operator determined barring
16	Normal call clearing
17	User busy
18	No user responding
19	User alerting, no answer
21	Call rejected
22	Number changed
26	Non selected user clearing
27	Destination out of order
28	Invalid number format (incomplete number)
29	Facility rejected
30	Response to STATUS ENQUIRY
31	Normal, unspecified
34	No circuit/channel available
38	Network out of order
41	Temporary failure
42	Switching equipment congestion
43	Access information discarded
44	Requested circuit/channel not available
47	Resources unavailable, unspecified
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred with in the CUG
57	Bearer capability not authorized
58	Bearer capability not presently available

63	Service or option not available, unspecified
65	Bearer service not implemented
68	ACM equal to or greater than ACMmax
69	Requested facility not implemented
70	Only restricted digital information bearer capability is available
79	Service or option not implemented, unspecified
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination
91	Invalid transit network selection
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with protocol state
102	Recovery on timer expiry
111	Protocol error, unspecified
127	Interworking, unspecified
240	FDN is active and number is not in FDN
241	Call operation not allowed
252	Call barring on outgoing calls
253	Call barring on incoming calls
254	Call impossible
255	Lower layer failure

Note: All other values in the range 0 to 31 shall be treated as cause 31
All other values in the range 32 to 47 shall be treated as cause 47
All other values in the range 48 to 63 shall be treated as cause 63
All other values in the range 64 to 79 shall be treated as cause 79
All other values in the range 80 to 95 shall be treated as cause 95
All other values in the range 96 to 111 shall be treated as cause 111
All other values in the range 112 to 127 shall be treated as cause 127

A.2. (+CME ERROR: <error>) Report Error Codes

<error>	Description
3	Operation not allowed
4	Operation not supported
5	PH-SIM PIN required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
16	Incorrect password
20	Memory full
21	Invalid index
22	Not found
24	Text string too long
26	Dial string too long
30	No network service
32	Network not allowed – emergency calls only
40	Network personalisation PIN Required (Network lock)

A.2.1. (+CMS ERROR: <SMSerror>) Report Error Codes

<SMSerror>	Description
Da 1 a 127	Error cause values from the GSM recommendation 04.11 Annex E-2
301	SMS service of ME reserved +CSMS
302	Operation not allowed All SMS commands
303	Operation not supported All SMS commands
304	Invalid PDU mode parameter
305	Invalid text mode parameter
310	SIM not inserted All SMS commands
311	SIM PIN required All SMS commands
312	PH-SIM PIN required All SMS commands
313	SIM failure All SMS commands
316	SIM PUK required All SMS commands
317	SIM PIN2 required All SMS commands
318	SIM PUK2 required All SMS commands
321	Invalid memory index
322	SIM memory full
330	SC address unknown
340	No +CNMA acknowledgement expected +CNMA

A.3. Values of the speaker gain (AT+VGR=<val>)

<val>	Speaker gain
0 – 15	+6 db
16 – 31	+4 db
32 – 47	+2 db
48 – 63	+0 db
64 – 79	-2 db
80 – 95	-4 db
96 – 111	-6 db
112 – 127	-8 db
128 – 143	-10 db
144 – 159	-12 db
160 – 175	-14 db
176 – 191	-16 db
192 – 207	-18 db
208 – 223	-20 db
224 – 239	-22 db
240 – 255	-24 db

A.3.1. Values of the Microphone transmission (AT+VGT=<val>)

Values for "telephone handset"		Values for "loud speaking telephone"	
<val>	**Gain**	**<val>**	**Gain**
0 – 31	+30 db	0	+0 db
32 – 63	+33 db	1	+0,5 db
64 – 95	+36 db	2	+1 db
96 – 127	+39 db	3	+1,5 db
128 – 159	+42 db	…	…
160 – 191	+45 db	19	9,5 db
192 – 223	+48 db	20	10 db
224 – 255	+51 db	21 – 60	30 db
		61	30,5 db
		62	31 db
		…	…
		101	50,5 db
		102 – 127	51 db
		128 – 243	-6,5 db
		244	-6 db
		245	-5,5 db
		246	-5 db
		…	…
		255	-0,5 db

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